



JY disc filtration system

- **Application**

- | Particle filtration
- | Pre-filtration before ultra-pure water treatment processes
- | Membranes, cartridges and media filters protection
- | Nozzle protection
- | Cooling water filtration
- | Boiler feed water filtration
- | Water recycling and effluent recovery



JY3-4 flow rate 10-100M³/H



filtration process



JYF2-3

- **Features**

- | Precision filtration: various micron-precise disc choices for different water condition, including 20 μ , 50 μ , 100 μ , 200 μ .
- | High efficient backflushing: high-speed and completely backwashing in approximately 20 seconds.
- | Automatic operations and continuous water supply: There are several filtering units in a filtration system. While a single unit is backwashing, other units are still working and ensure the continuous water supply and negligible pressure loss. The system can automatically alternate in filtering or backwashing mode.
- | Modular filtering unit design: Standard modular filtering unit design makes the system flexible and inter-exchangeable at user's requirements.
- | Flexible system design: flexible and compact design suitable for any place or corner space.
- | Reliable operations and easy maintenance: no daily-maintenance required, 100% factory tested and operated, no tools required, few spare parts.
- | Durability: High-tech strong filtering cartridge ensures negligible wear and tear, or corrosion. In years of industrial applications, there will be no deterioration of filtration and backwashing performance.

- **System Configurations**

JY Series disc filtration system is to parallel several filtering units.

The basic configuration: JY 2-3~5-----3~5 pcs of 2" filtering heads

JY 3-3~10----3~10 pcs of 3" filtering heads

- **Working principle**

filter disc Structure



JY Filtration system includes two type of basic filtering units: JY2, JY3. The filter is comprised of the grooved discs. The junction of the groove of one disc with the adjacent disc can retain the solids in the water. Disc filters provide in-depth, three-dimensional filtration using stacks of compressed discs.

- **Filtration Process**

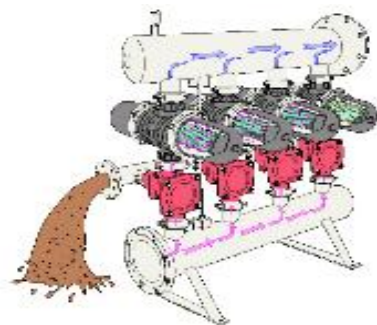
The filtration discs are tightly compressed together by the force from the spring and hydraulic pressure to retain the particle in the feed water.

- **Backwashing Process**

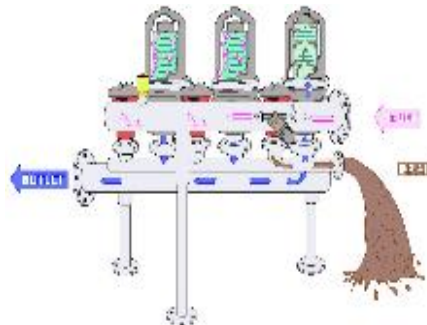
An controller activates the valves to reverse the flow direction. Then the hydraulic pressure on the piston changes direction and discs are released. Nozzles located at the center of the disc element spray tangential jets, causing the discs to spin and the retained solids are flushed out.

- **Technical data**

- Operating pressure: 0.08-0.8Mpa
- Backwashing pressure: 0.15-0.6Mpa
- Backwashing time: 5-20 seconds, adjustable
- Volume of backwash for each filter head: 30-100 liter
- Pressure loss: 0.001-0.08Mpa
- Working temperature: 4-75℃
- PH: 4.0-13



JY3-4 flow mode



JY2-3 flow mode

- **Material**

JY filtering heads are made of reinforced polyamide. No wear and tear, and is corrosion resistance. The max working pressure can be 0.8Mpa. The material of discs is polypropylene. The seal is EPDM. The inlet, outlet and drain manifolds are all made of stainless steel.

water resource filtration degree	good				average				poor				very poor				dimension L×W×H×DN	weigh kg
	200μ	100μ	50μ	20μ	200μ	100μ	50μ	20μ	200μ	100μ	50μ	20μ	200μ	100μ	50μ	20μ		
type	flow M ³ /H				flow M ³ /H				flow M ³ /H				flow M ³ /H				mm	
JY2-3	75	60	42	21	57	45	33	15	40	30	22	10	24	19	13	7	1255×719×1298×D100	59
JY2-4	100	80	56	28	76	60	44	20	54	40	30	14	32	26	18	10	1255×719×1298×D100	77
JY2-5	125	100	60	35	95	75	55	25	67	50	37	17	40	32	22	12	1855×719×1298×D150	95
JY3-3	≤111	≤90	≤80	≤30	≤84	≤66	48≤	≤22	≤60	≤45	≤33	≤15	≤36	≤28	≤19	≤10	815×865×1360×D200/150	145
JY3-4	148	120	80	40	112	88	64	30	80	60	44	20	48	37	26	14	1115×865×1360×D200/150	192

JY3-5	185	150	100	50	140	110	80	37	100	75	55	25	60	47	32	17	1415×865×1360×D200	239
JY3-6	222	180	120	60	168	132	96	45	120	90	66	30	75	56	39	21	1715×865×1360×D200	286
JY3-7	259	210	140	70	196	154	112	52	140	105	77	35	84	66	45	24	2015×865×1360×D200	333
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JY3-9	333	270	180	90	252	198	144	67	180	135	99	45	108	85	58	31	2615×865×1360×D200	427
JY3-10	370	300	200	100	280	210	160	75	200	150	110	50	120	94	65	35	2915×865×1360×D200	474

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Technical Manual Of Disc filtration system

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Technical Manual of Disc Filtration System

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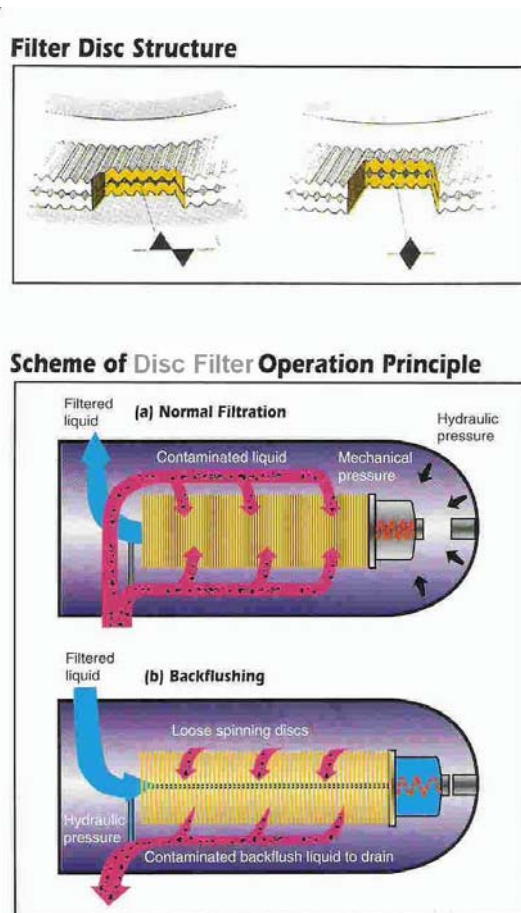
1. General Description and Features

1.1 General

The disc series filtration system consists of automatic self-cleaning disc filters as its basic unit. Disc filters provide in –depth, three dimensional filtration using stacks of compressed discs. The main advantages of the Disc filter design are:

- Efficient and accurate filtration;
- Fast and efficient back flushing;
- Modular unit design, easy installation and maintenance
- Automatic control and continuous water supply
- Reliable operation and long life durability.

1.2 Operation Features



---During the filtration process, the filtration discs are tightly compressed together by the inlet hydraulic pressure and spring, thus providing high filtration efficiency.

---During back flushing process, the discs are loosened by releasing the hydraulic pressure. Multi-jet nozzles provide tangential spray to the loosened discs, causing them to spin. As this occurs, the retained solids are flushed outwards on the discs, quickly and efficiently.

---Since the discs are loosened, back flushing time last shorter and cleaning is more efficient, which results in minimizing flush water consumption.

---The volume of flush water is regulated by means of an expanding sleeve and nozzle

which guarantees efficient back flushing and water consumption minimization.

---Operating system is easy and automatic and no special tools needed.

---The filter element is automatically cleaned during each back flushing and does not require workforce, expense and seasonal replacement.

---The compact design allows easy and space saving installation;

---Water supply is uninterrupted during back flushing stage.

1.3 Filtration Principles

--- Filtration precision of filter's disc ranges from 200 ? (micron) to 20?. Each type disc is identified by a special color, GRAY 20? /GREEN 50? /RED 100? /YELLOW 200?

---The disc is made of polypropylene plastics with grooved setting.

---The retention point of solids is the junction of the groove of one disc—with the shoulder (rim between discs) of the adjacent disc.

- While feed water penetrates from the peripheral end to the core of the element, there are 32 stopping points (in 20?) in each track, thus creating the IN DEPTH filtration function.
- During this filtration process, the discs are tightly compressed by mechanical and hydraulic forces.
- During back flushing process, electronic controller activates the valves to reverse the flow direction. While this occurs, the hydraulic pressure on the piston changes direction and the discs are released. Nozzles located at the center of the disc element spray tangential jets, causing the discs to spin and the retained solids are flushed out.

2. Design Consideration

2.1 Sizing the number of filter units

There are three main parameters that determine the size of the filter system:

- Water quality;
- Filtration grade
- Flow rate

Water quality

Water quality categories

Generally, water quality is directly related to source of water that is divided into four classes.

A. Good quality

Municipal supply

Well water which draws from a steadily flowing aquifer with well being properly maintained. There is no presence of iron or magnesium

B. Average Quality

Circulated cooling water

Rivers, streams and canals which flow speed is slow, even emerging sedimentation phenomena.

Reservoir water under the cold climate, where the pumping point is properly placed, taking sedimentation into account.

Sewage water: after effective sedimentation and complete biological degradation.

C. Poor Quality

Well water which draws from a poor quality aquifer

Sewage water: after effective sedimentation with little or no biological treatment.

Rivers, streams and canals found in hot climates with high biological growth and no chemical treatment.

Reservoir water: under the high temperature, Poor placement of pumping point with little or no sedimentation or a soluble content that provides environment to growth of high organic load.

D. Very poor Quality

Well water from the well which has collapsed or high load of iron or magnesium

Rivers, streams and canals attacked by flood and lack sedimentation facilities.

Reservoir water where the source of water has been mixed with sewage and flood water and the pumping point and level are poorly placed.

Sewage water without sedimentation and presence of oxidation activities.

In order to create optimum conditions of the filtration system, pretreatment is required for the type D water. TSS (Total Suspended Solids) is considered as one of index of water quality. Sometimes we identify good quality as which TSS under 50 ppm, Average quality as which 50-100ppm, Poor quality as which 100-200 ppm while which with TSS above 200ppm as Very poor quality.

However, due to complexity of water composition, TSS is not the only index to identify water quality,

neither is universal. We strongly suggest that the TSS of source water should not exceed 200 ppm when choosing filtration grade as precise as 50? or finer.

Filtration grade

The filtration grade will be determined according to the specific equipment that is protected by the filter system, or the water quality requirements. The options are: 20?; 50?; 100?; and 200?

Flow rate

The filter system design should take the maximum flow rate that may flow through the system during the filtration process into consideration.

The chart “ Disc Filter Technical Data” are designed for user tosize the filtration system according to the factors above.

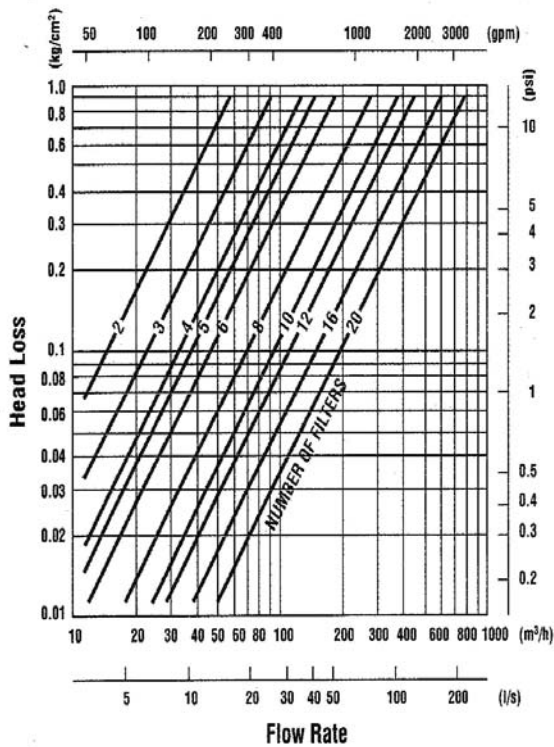
(see Chart of Disc Filter Technical Data)

3. Head loss chart for Disc filters in a clean state

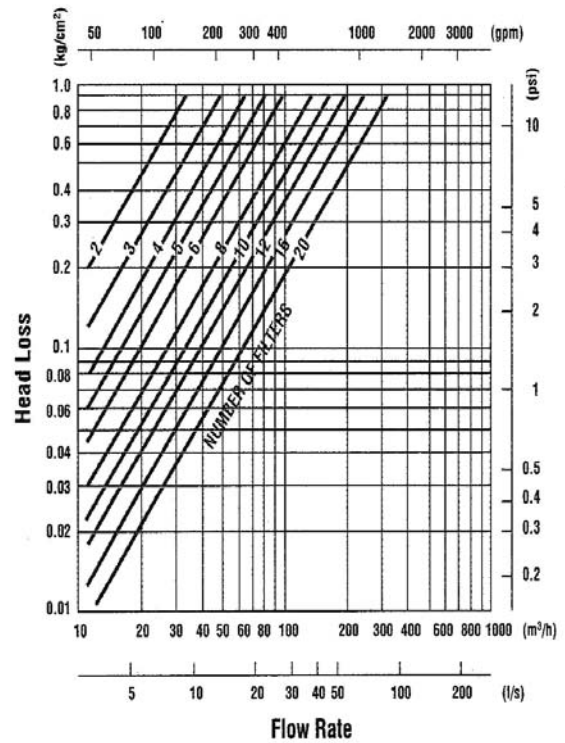
(See Head loss Chart)

JY Filter Head loss Chart

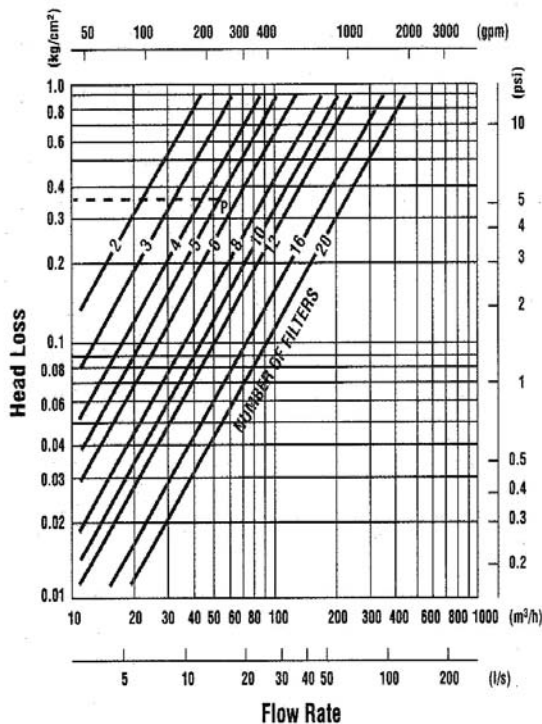
(include losses through filters, valves, manifolds and fittings)



(a) Sizing Chart for 400-100 micron discs.



(c) Sizing Charts for 20 micron discs.



(b) Sizing Chart for 55 micron discs.

How to use the chart:

Find the intersection point "P" of the vertical line corresponding to the total flow rate of the system and the diagonal line corresponding to the number of filters in the battery.

Draw a horizontal line from point "P" to find the pressure loss through the filter battery for clean filters.

Example: Find the pressure loss through a filtration battery consisting of 55 micron discs. The source is average quality water and the total system flow rate is 55 m³/h (240 gpm).

(a) Five filters are required for average quality water 55 m³/h (240 gpm).

(b) When 55 m³/h and 5 filters are entered on the chart, pressure loss through the battery is 0.38 at. (5.3 P.S.I.).

4. Operation Conditions

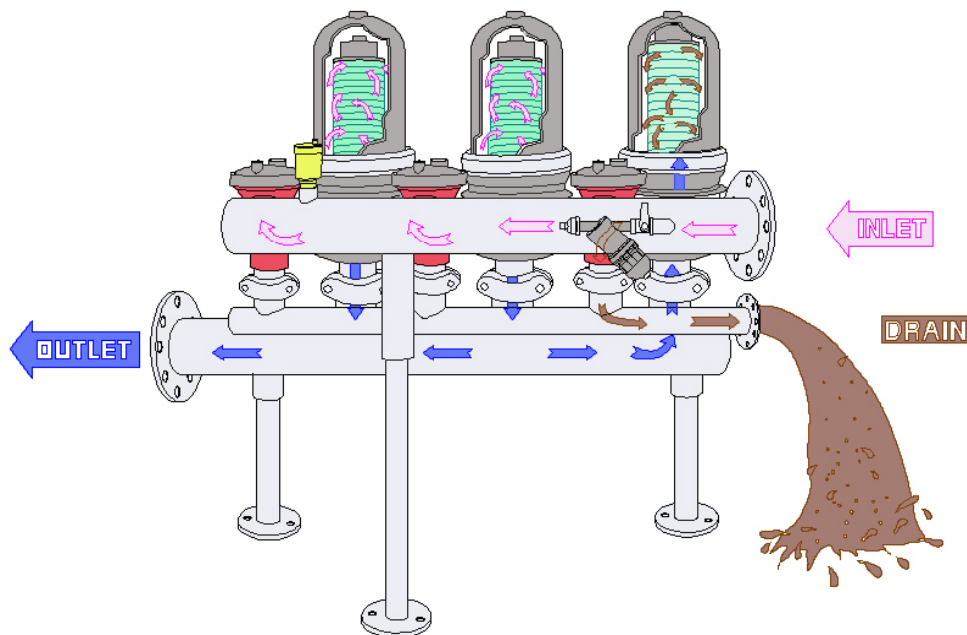
Operational pressure : 0.3-0.8 Mpa;
Backwashing pressure : minimum 0.28MPa;
Backwashing time: 5-20 seconds, adjustable
Volume of each filter head backwashing: 30-100 liter
Pressure loss : 0.001-0.08 MPa
Max. working temperature: 75 °C
pH: 4-13

5. Operation Mode

(See Operation Mode Chart)

5.1 Filtration Process

- During the filtration stage, inlet water flows into filter unit through Inlet manifold and Valves;
- The filtrated water outflows through Outlet Manifold to the consumer

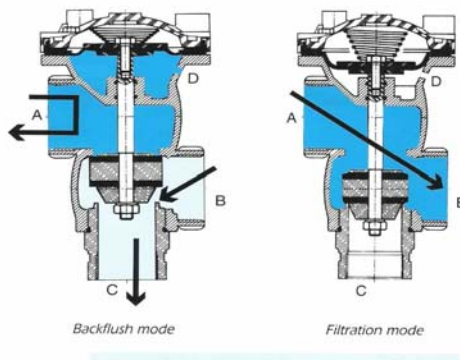


5.2 Backflushing Process

- The Controller transmits a pulse to Solenoid No.1 when set-point of differential pressure or time is reached (pressure difference or time, whichever is first).
- Solenoid No.1 sends a pressure pulse to two users simultaneously,
 - a) the Inlet valve No.1 converts from filtration stage to back flush stage after receiving pressure pulse.
 - b) the piston of Filter No.1 lifts, thus decompressing discs to insure efficient and full cleaning. The water for backwashing is provided from outlet manifold. Simultaneously, rest filter unite is keeping service. This process is to last 15 - 20 seconds;
- Upon completion of the intended back flushing time, the controller releases the back flush pulse via the solenoid, which leads to drain the Filter No.1 pressure from the spine. The piston closes and recompresses the discs, Filter 1 returns to filtration state.
- Back flush of filter unite 2 is activated with same working principle of filter unite 1. Similarly, rests will startup in sequence with intervals of a few seconds between each filter
- Filters go into back flush state one by one to ensure continuous water supply of system.
- After backwash of all filter units in the system, the filtration system will return to its initial operational state.

6. Control Valve

Mode of operation (see illustration drawings)



-- Filtration mode

Water flows from port A(inlet supply) to port B (filter connection). Port C (flushing water outlet) is closed by the lower seal.

--- Backflush mode

Command pressure is applied to the bottom side of the diaphragm through port D. the diaphragm moves up, pulling the sealed body by the shaft. Port A is closed by the upper seal, preventing flow to the filter. Port C is now open, allowing flushing water flow from port B (filter connection).

7. Installation and start up

Conditions required

- a level piece of concrete base;
- Inlet and Outlet connected pipes with manual valves installed at the both ends;
- A pressure gauge installed at Outlet before the outlet manual valve;
- A 220V/50Hz power source near installation site.

Start up preparation

- Check if the Inlet and Outlet is connected correctly;
- Check if the Drain line is connected correctly;
- Check if the air vent device is installed correctly;
- Check if controller and its signal lines is connected correctly;
- Check if the power of the controller is connected;
- Check if DP pressure gauge is connected correctly (High Pressure and Low Pressure)
- Read user's guide for controller, check and set the operation program;

Start up

Making sure all above preparation is complete and start to supply water into the system, then slowly shut down outlet valve so that the pressure at outlet is not lower than 0.28Mpa.

8. Disc Filter System Maintenance

---Weekly Check

Pressure

Leakage

Backflush controller

Cleaning command filter

---Monthly Operate

Operate backflush according ΔP meter and check

- Solenoids
- Backflush valves
- Pressure downstream and drain (during backflush)
- After backflushing is completed, open one filter cover to ensure good cleaning of the discs(do not open clamp while filter is under pressure)

---Seasonal Maintenance

- Open all of the filtration units and check; the 76? 4 and 14? 2 O-rings, replace if needed;
- Lubricate 76? 4 O-rings with silicone grease
- Ensure thorough cleaning of the discs (if there is any residue in the grooves of the discs, dip into acid and clean it)

--- Winterization

- Release all the water from the filtration and command systems (leave the valve open)

9. Troubleshooting

Every set of system is tested and trial operated before ship, however, like any equipment, a filtration system may occasionally malfunction due to various reasons. This can be defined as three levels:

9.1 Source supply, design, operation conditions

If the problem derives from the design, plant conditions or inadequate supply sources then it should be dealt with at this level.

9.2 System troubleshooting

if the malfunction source is in the filtration system then refer to the Troubleshooting Guidance Chart in the following pages.

9.3 Single element troubleshooting

This comprehensive, detailed level is added at the following pages to enable quick detection and replacement of single elements, valve, spine, control and solenoids.

Troubleshooting Guidance Chart

Troubleshooting Chart No.1

Troubleshooting Chart No.2

Troubleshooting Chart No.3

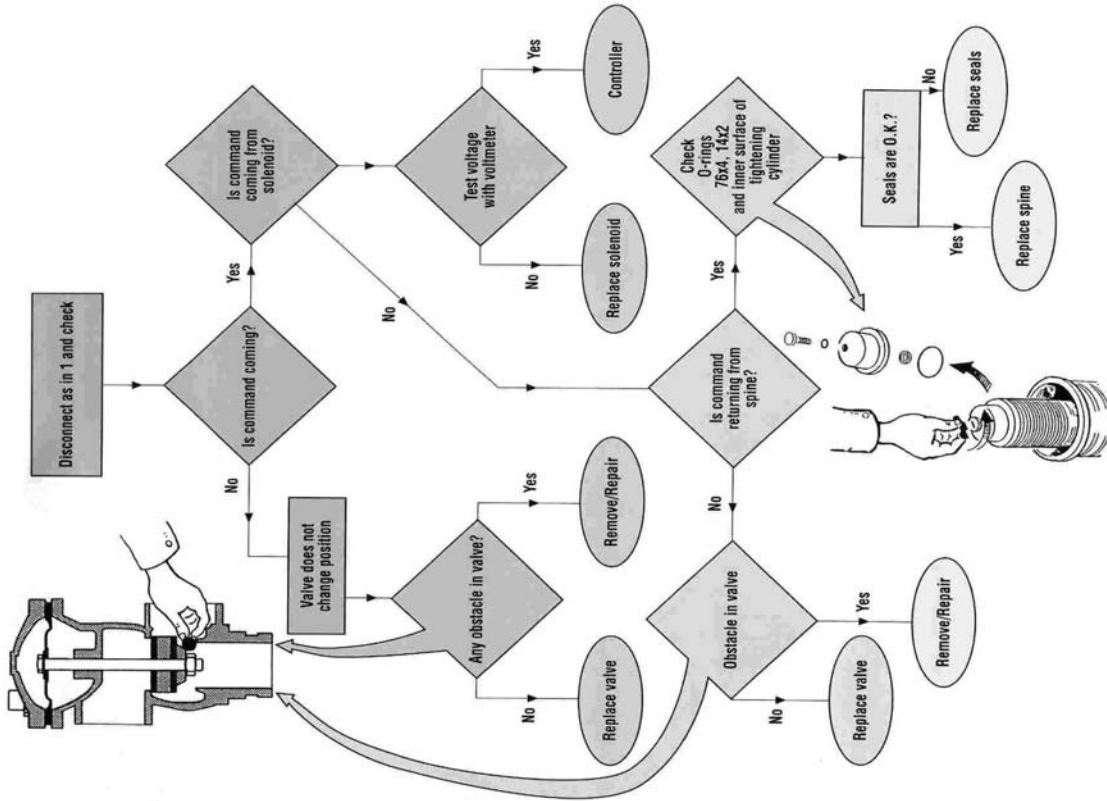
Illustration chart of opening and disassembling the filter element

Troubleshooting Guidance

No.	Malfunction	Cause	Troubleshooting
1	Too low flow	a. Pressure too low b. Pipe diameter small; c. filters heads not enough; d. backflush not in time	a. increase the pressure b. change thicker pipe c. add filters d. reset backflush initiate
2	Outlet quality not satisfied	a. Disc precise not proper b. Backflush not thorough c. Disc filter not fit source water with special characters.	a. re-select correct disc b. increase flushing time or check flushing trouble as in Guidance No.7 c. Change System design
3	One or more filters fails to flush	Check as in Troubleshooting Chart No.1	Repair accordingly
4	Backflushing does not stop	Check as in Troubleshooting Chart No.2	Repair accordingly
5	Backflush valve leak	a. valve problem b. Outlet pressure less than 0.28Mpa;	a. disassembling flush valve, clean and repair it; b. increase inlet pressure or reduce the outlet valve making back pressure up to 0.28 Mpa.
6	Backflush startup frequently	a. High TSS in source water b. Δ P is too small or the time set too short; c. Disc Fouled by oil/biology pollutant/scales	a. add pretreatment to source water; b. reset flush initials c. Opening filters, take out discs and clean in.

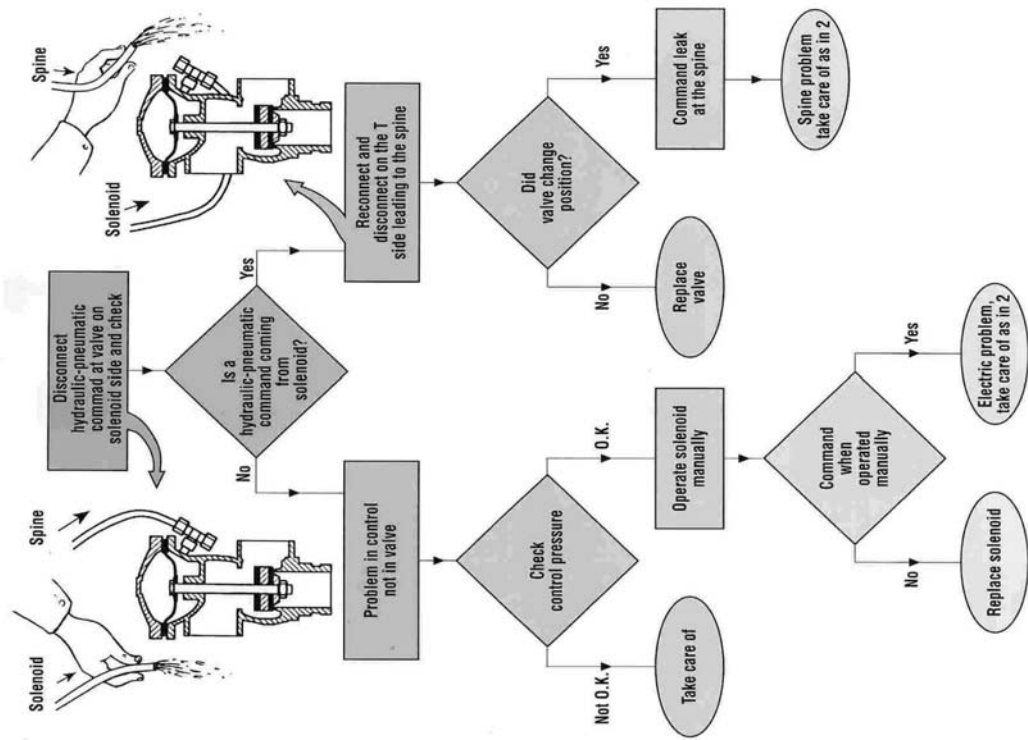
7	Backflushing is not sufficiency	<ul style="list-style-type: none"> a. Back pressure is less than 0.28Mpa; b. Drain line not correctly installed c. The same as in No.6 	<ul style="list-style-type: none"> a. Increase inlet pressure or reduce the outlet valve making back pressure up to 0.28 Mpa b. Make drain line smooth enough to drain; c. The same as in No.6
8	No signal of flush initiate	<ul style="list-style-type: none"> a. filter of signal water is clogged b. tube of signal is clogged; c. problem of controller setting 	<ul style="list-style-type: none"> a. clean signal water filter; b. clean signal tube; c. check controller setting and repair it.
9	Drain from Solenoid does not stop	<ul style="list-style-type: none"> a. leak of Solenoid b. Backflushing valve leak 	<ul style="list-style-type: none"> a. Check the switch of the solenoid manually, and clean it b. Open backflush valve, clean and repair if needed

Malfunction No. 2 Backflushing does not stop



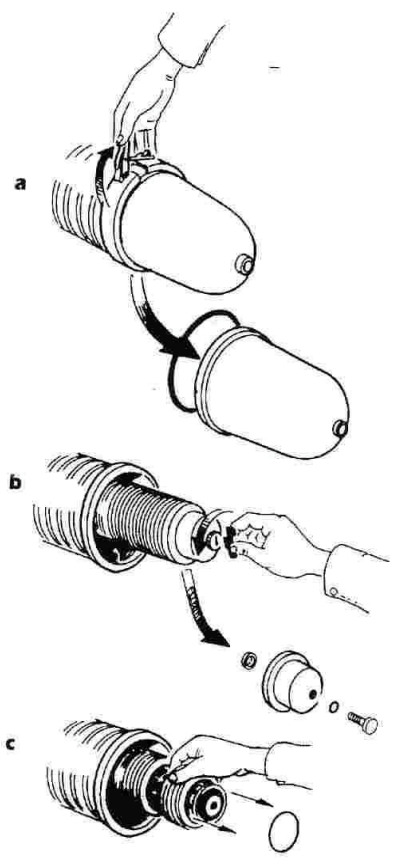
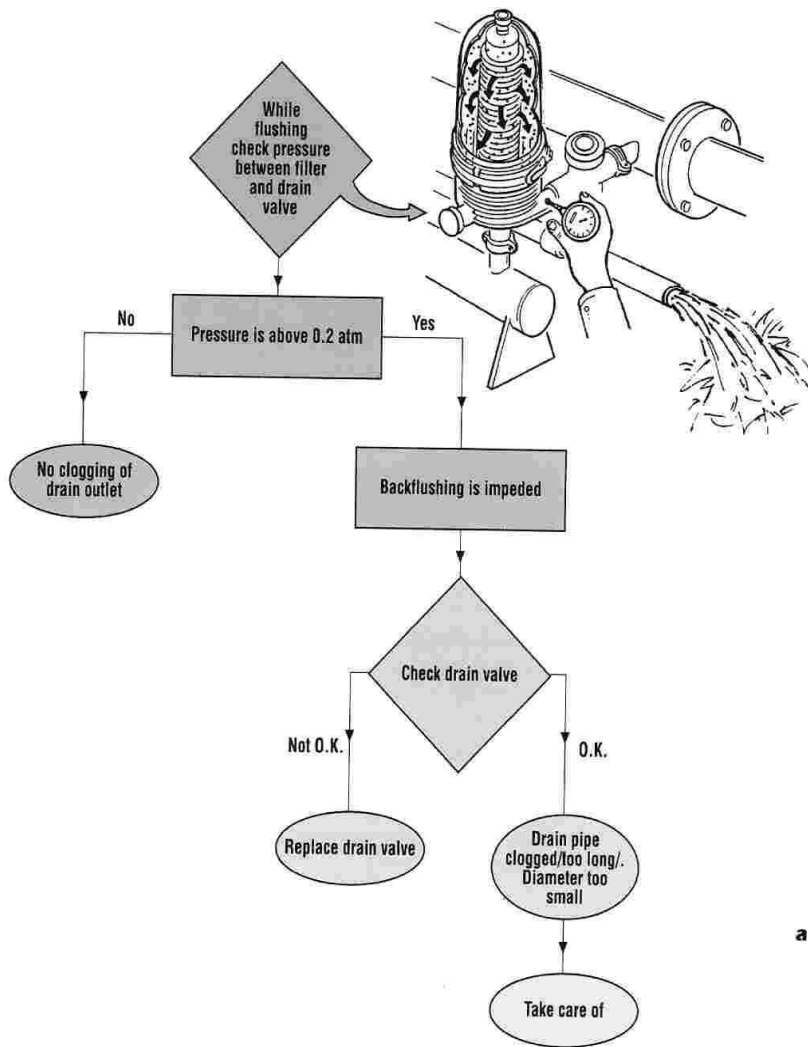
Malfunction No. 1

Flush of one or more filters fails to commence



Malfunction No. 3

Clogged battery/backflushing not operating satisfactorily



Opening and Disassembling the 2" Disc Filter Element

CAUTION!

Do not dismantle while unit is pressurized!
Relieve pressure by activating the backflushing process or properly venting the unit.

Basic Maintenance:

- (a) Open filter cover clamp. Pull cover and check integrity of hydraulic seal.
- (b) Using the special key, open hollow screw and remove tightening cylinder.
- (c) Remove grooved discs from filter spine.

Service Maintenance

- (a) Unscrew filter spine from filter body by gently rotating the whole spine counterclockwise, using the special wrench supplied for this purpose.

JY Disc Filter Technical Data

Inlet Water Quality	Good				Average				Poor				Very Poor				Configuration Size	Weight
	200 μ	100 μ	50 μ	20 μ	200 μ	100 μ	50 μ	20 μ	200 μ	100 μ	50 μ	20 μ	200 μ	100 μ	50 μ	20 μ		
TYPE	Flow Rate M ³ /H				Flow Rate M ³ /H				Flow Rate M ³ /H				Flow Rate M ³ /H					
JY2-3	75	60	42	21	57	45	33	15	40	30	22	10	24	19	13	7	1255 X 719 X 1298 X D100	59
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JYX-18	666	540	360	180	504	396	288	135	360	270	198	90	216	171	117	63	1760 X 1970 X 2170 X D300	860
JYX-24	/	/	480	240	/	528	384	180	480	360	264	120	288	228	156	84	1760 X 1970 X 2570 X D300	1100